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Some New Evidence on Overtime Use, Total Job Compensation, and Wage Rates

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Some New Evidence on Overtime Use, Total Job Compensation, and Wage Rates

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Abstract: This paper is a replication of research reported by Steven Trejo in the 1991 American Economic Review. Trejo used labor force data from the seventies to assess the relevance of two contrasting views of the impact of overtime pay regulation. This paper reports research using a recent representative sample of U.S. private industry jobs that includes employer-reported measures of usual annual hours of overtime work and comprehensive measures of employer costs for job compensation. Comparisons are made between a set of jobs likely to be subject to U.S. overtime pay regulation—jobs paid hourly on 40 hour a week schedules—with another set of jobs that can offer overtime but are not likely to be subject to Federal overtime requirements—jobs on reduced hour schedules. The main findings of the research are: (1) higher wage rates are associated with a lower incidence of overtime work among the set of jobs with 40 hour work schedules, but not among the set of jobs with reduced hour schedules (2) in jobs using overtime work, more usual overtime work is associated with lower wage rates among the jobs with 40 hour work schedules, but not among the jobs on reduced hour schedules (3) higher "quasi-fixed" job compensation, such as employer health insurance costs, is associated with a higher incidence of overtime use. The paper also discusses some of the difficulties of interpreting these statistical results in the context of the labor market models considered by Trejo.

JEL Codes: J33 (Compensation Packages; Payment Methods); J31 (Wage Level and Structure; Wage Differentials)

Keywords: Overtime work hours; Hedonic Wage Curve

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Introduction

Most economic analysis of hours worked focuses on the demand and supply for hours worked--how optimal hours of work for firms and workers depend on an hourly price of labor. The usual textbook analysis of overtime pay regulation takes a labor demand approach; see, for example, Ehrenberg and Smith (2000, pp. 150-153). In the labor demand model, the requirement of an overtime premium increases the price of labor in the overtime region, thereby reducing the firm's demand for hours and encouraging substitution of workers for overtime hours in the composition of the firm's labor input. In contrast, Lewis (1969) and Barzel (1973) developed a different view of the employment relationship in which a statutory overtime premium has no necessary impacts on the employment bargain between workers and firms. In particular, Trejo (1991) observed that in the Lewis-Barzel analysis, the preferred "job package" of total earnings and hours worked will be unaffected by an overtime pay requirement so long as workers and firms can agree on compensating adjustments in the straight time wage rate or other compensation.

How the adjustments in the structure of compensation in the Lewis-Barzel analysis works in the context of U.S. overtime pay regulation, which requires payment of a premium of one and a half of the usual straight-time wage rate beyond forty hours a week in most hourly jobs, can be illustrated with a simple example. If workers had bargained with a firm to work 50 hours a week at a wage of $6 per hour, the "package" of weekly hours and earnings ($300 per week for 50 hours of work) would be unaffected by imposition of an overtime premium if, for example, the payment of weekly earnings was restructured to account for the overtime premium, such lowering the straight-time wage rate to $5 per hour and adding a "weekly bonus" of $25. Besides transactions costs, an important barrier to making such adjustments in low wage jobs is the minimum wage; all jobs subject to overtime pay requirements are also subject to the minimum wage under the U.S. Fair Labor Standards Act (FLSA). Costa (2000) found that at the time of the enactment of the FLSA in 1938, which introduced both the Federal minimum wage and the overtime pay requirement, overtime hours worked in Southern retail and wholesale trade industries declined; Costa attributed this decline to the low prevailing wages in the South prior to the enactment of the FLSA.

Trejo (1991) analyzed several cross sections of Current Population Survey (CPS) data on weekly earnings and usual hours worked to assess whether the traditional labor demand analysis, which he termed the Fixed-Wage Model, or the Lewis-Barzel analysis, which he termed the

Fixed-Job Model (since this model does not consider worker-overtime hour substitution explicitly[1]), better predicts the pattern of overtime incidence and the structure of labor earnings observed among workers subject to U.S overtime pay regulation. Section II of the paper discusses more fully his methodology and findings, but here we review a few key results in Trejo’s findings to better motivate the research reported in this paper. Trejo found the incidence of workers having exactly 40 hour weekly work schedules was higher in jobs with FLSA overtime pay regulation coverage, and Trejo interpreted this spike in the weekly hour distribution as consistent with the Fixed-Wage Model predicting lower incidence with overtime pay regulation. Workers in jobs paying the minimum wage were more likely to work exactly 40 hours a week (i.e., working less overtime), suggesting that the minimum wage acts as a barrier to the restructuring of compensation with overtime pay regulation, as predicted by the Fixed-Job Model. Other findings were consistent with the predictions of the Fixed-Job Model, but the degree of consistency of these findings depended on the measurement of earnings used. The cross section relationship between usual weekly earnings and overtime hours was exactly as predicted by the Fixed-Job Model, but the cross section relationship between the straight-time wage rate and overtime hours indicated only partial adjustment in the structure of labor earnings that would be required to equalize labor earnings between jobs requiring an overtime premium and jobs that did not.

The purpose of this paper is to report on a replication of a large part of the research reported in Trejo (1991), using establishment data that provide more consistent and comprehensive data on worker compensation and a measure of overtime hours that is more appropriate for testing the predictions of the Fixed-Job Model on the impact of U.S. overtime pay regulation. The Fixed-Job Model is best seen as a proposition about the nature of the employment bargain with expected (ex ante) overtime hours. The firm’s requirements for overtime can fluctuate from week to week due to expected variation of market demand or the timing of production so that one would expect in most employment situations that transactions costs would limit the adjustment of straight-time wage rates with weekly fluctuations in overtime hours. For the research completed for this paper, I use micro data from the U.S. Bureau of Labor Statistics National Compensation Survey (NCS), which is a representative sample of U.S. nonagricultural private industry jobs. Of key importance for the objectives of the current research is that the NCS collects data on usual annual overtime hours along with collection of comprehensive annual labor costs for employee compensation. We use a recent cross section of NCS data (March 2004) to analyze the relationship between annual overtime hours with the level and structure of usual

[1] However, Cutler and Madrian (1998) use a variant of this model to analyze worker-hour substitution.

annual labor compensation. In addition to examining the relationship between the amount of overtime used and adjustments in the straight-time wage rate that can be attributable to overtime pay regulation, I also examine the relationship between the amount of overtime hours and labor costs not directly related to the amount of overtime hours worked (such as the employer costs for health insurance contributions) because such "quasi-fixed" costs of labor could be an alternative channel for the adjustments in the structure of job compensation induced by overtime pay regulation. Section IV of the paper discusses the NCS data set and the subsets of these data used in the analysis.

Another difference between Trejo's original 1991 study and the current paper is an attempt in this paper to infer more about the effects of overtime pay regulation from variation in overtime hours and earnings within the group of jobs subject to overtime pay regulation, as compared to such variation within a group of jobs not subject to overtime pay regulation. The Lewis-Barzel analysis underlying the Fixed-Job Model uses a hedonic locus of total earnings and hours worked as an analytical point of departure. Section III of the paper reviews this connection in more detail as a foundation for the statistical analysis. Drawing on the analysis of Kinoshita (1987), we use the distinction between the statutory overtime premium—for example, time and a half in U.S. overtime pay regulation—from a "Job Market Overtime Premium", a term I use to refer to the labor cost differential in an alternative job requiring an additional hour of overtime, to analyze the relationship between the level and structure of labor costs under an overtime pay constraint in the Fixed-Job Model.

Sections V and VI present the methodology and results of the statistical analysis of the NCS data. Consistent with Trejo's findings, I conclude from an analysis of incidence that overtime pay regulation does introduce a kink in a job's labor cost structure with overtime, consistent with the Fixed-Wage Model. Also, I find that full-time jobs paying at or close to the minimum wage and subject to overtime pay regulation do not have a lower incidence of overtime work. This result is contrary to Trejo's findings, which were based on data from the seventies when the real value of the minimum wage was much higher than in the current decade. Estimating a cross section relationship between total "hours-related" labor costs and overtime hours worked, I find that the predicted log differential with overtime hours in these hours-worked driven labor costs is about 85 per cent of the labor costs predicted by the Fixed-Wage Model. I also show that this mitigation of the labor cost impact of U.S. overtime pay regulation occurs because of reductions in the straight-time wage rate with increased overtime, as implied by the Fixed-Job Model. Section VII concludes with some qualifications about making such inferences about the empirical relevance of the Fixed-Job Model, given the study methodology, and suggests some areas of additional research.

II. A Closer Look at the Trejo (1991) Research on Overtime Pay

Trejo's empirical strategy was to compare hours and earnings in jobs with jobs presumed to have the FLSA overtime requirements with those jobs presumed to be exempt from FLSA overtime requirements. In general there are three types of nonagricultural[2] jobs exempt from the FLSA overtime pay requirements: (1) salaried jobs that have job duties that meet certain tests for exemption, such as managers and executives[3] (2) some hourly paid occupations in transportation industries involved in interstate commerce that have overtime pay regulated by other Federal law, and (3) "miscellaneous exemptions that apply to certain workers in retail trade, services, and state and local government" (Trejo (1991), p. 724). Trejo used the worker population in groups (2) and (3)—workers paid hourly—as his comparison group.

Two margins of firm decision-making that Trejo examined to obtain evidence on the effect of overtime pay regulation were the decision to offer overtime and, if overtime is offered, the earnings-hours combination offered in the job.[4] Since the Fixed-Wage Model implies a kink in the earnings-hours combination at 40 hours for firms subject to FLSA overtime pay regulation, incidence should be lower than in firms exempt from FLSA coverage. The only prediction for incidence of the Fixed-Job Model would be if minimum wage requirements (also dictated by the FLSA) prevented adjustments in the structure of overtime to realize a desired earnings-hours combination. For example, if a job exempt from FLSA overtime pay requirements paid $5.15 per hour and had a 44 hour work week, a comparable job covered by FLSA overtime pay requirements could not provide the same hours-earnings package because the requirement to pay time and a half would also require a base wage of $4.92 per hour, below the minimum wage of $5.15.

Examining the incidence of overtime, Trejo did find a higher proportion of FLSA exempt jobs had work weeks greater than forty hours. (For this analysis, he used actual rather than usual work hour responses.) For example, in the 1974 data, 68 % of the workers working 40 or more hours in jobs covered by FLSA overtime requirements worked exactly 40 hours while only 55%

[2] Agricultural jobs are also exempt, possibly because of the role hours worked plays in agricultural technology processes required to supply perishable products, such as in harvesting.
[3] Since August 2004, job earnings thresholds have been added to these "job tests" criteria to define FLSA exempt status, but these changes occurred after the data used in this paper were collected.
[4] Trejo (1991) also examines estimates of firm compliance with overtime pay regulation; this evidence is not considered in the present study.

of workers in exempt jobs did so. As predicted by the Fixed-Wage Model the estimated probability of overtime work was lower in jobs with FLSA overtime coverage in two of the three cross sections of data studied. However, among workers with FLSA overtime coverage and working at least 40 hours a week, those earning minimum wage less likely to work overtime—more likely to work exactly 40 hours, as predicted by the Fixed-Job Model.

To examine the effect on the structure of earnings for workers that did work overtime, Trejo noted that since the Fixed-Job Model assumes equalization of total earnings between any two equivalent jobs, the relative straight-time wage between a job exempt from the FLSA and another equivalent job subject to FLSA overtime pay regulation depends on the amount of overtime worked. Let W be the straight time wage rate in the FLSA-exempt job and W' be the wage with FLSA coverage. With H denoting the common hours of work, with $H > 40$, then equalization of labor earnings between the two jobs implies $W H = W' [40 + 1.5 (H - 40)] = W' [H + 0.5 (H - 40)]$; thus $(W / W') = 1 + 0.5 [(H - 40)/H]$. (For example, the differential in straight time pay of the FLSA exempt job would be 1.0235 with a 42 hour work week and 1.045 with a 44 hour work week.) In a log straight-time wage regression on cross section data that controlled for other wage-determining characteristics the Fixed-Job Model would then predict[5] a coefficient of -0.5 on a variable that interacts FLSA coverage with $[(H - 40)/H]$. Similarly, the Fixed-Job Model predicts a coefficient of zero on that variable in a log weekly earnings equation.

For the log weekly earnings equation, Trejo measured as the dependent variable the CPS respondent's estimate of usual weekly earnings, although he noted[6] that respondents might not count usual overtime pay in reporting weekly earnings. Trejo found the effect of the ratio of overtime hours to total hours worked among jobs covered by FLSA on weekly earnings not to be statistically significant from zero, completely consistent with the predictions of the Fixed-Job Model. However using the CPS wage rate data—data reported separately by CPS respondents from usual weekly earnings—the magnitude of the overtime premium regulatory effect was much lower than as predicted by the Fixed-Job model—about a 0.2 differential in most estimations instead of the predicted 0.5 differential. (For example, with a 44 hour work week the straight-time wage rate equation would predict a relative straight time pay differential in exempt jobs of 1.018 instead of 1.045.) Thus, these two (independent) data sources on job compensation did not give completely consistent results for the effects of overtime pay regulation on earnings.

[5] The following is a log approximation, only valid when the ratio of overtime hours to total hours worked is small. In Section IV below, we show that this is the case in the data we examine.
[6] See Trejo (1991; p.738).

III. Kinoshita's Hedonic Wage Curve and the Structure of Compensation with Overtime Pay Regulation in the Fixed-Job Model

The data that Trejo used in his study was Current Population Survey data from the mid-seventies; applying Trejo's empirical strategy to recent data is more difficult because the proportion employed in hourly jobs and exempt from FLSA overtime requirements has declined considerably since the seventies. The U.S. Department of Labor estimated that the proportion of workers exempt from by the FLSA overtime pay provisions declined from 34% of all non-supervisory civilian workers in 1970 to 16% in 1989, with the largest contractions occurring in retail trade, services and local government.[7] Further reductions in workers exempt from FLSA coverage were likely to have occurred in retail trade and services establishments since 1989. In these industries, establishments below a nominal sales threshold ($500,000 annually) have been exempt from both FLSA minimum wage and overtime requirements, but inflation has substantially eroded the scope of this exemption since 1989. Also, while substantial exempt employment remains in some transportation occupations, much employment in this jobs involve long regularly scheduled work hours dictated by the production technology—not intermittent overtime work. For example, in the March 2004 data I used for this study, 51 per cent of those who worked as Captains, Mates, and Pilots of Water Vessels (SOC 535021) had usual work schedules over 40 hours a week; if crossing the ocean, as many such workers do, it's hard to work 9 to 5.

Given the reduced size of the hourly paid FLSA exempt workers in recent data I take a somewhat different approach to the empirical analysis. I examine variation in hours and earnings among jobs covered by an overtime pay requirement, with comparisons to a "control" group not subject to the overtime pay requirement. To relate these findings to the predictions of the Fixed-Job Model, I draw on some further development of the Lewis-Barzel analysis by Kinoshita (1987), in which the cross section patterns of total job compensation and hours worked in the data reflect a hedonic wage locus.[8]

The analysis underlying the Fixed-Job Model addresses a fundamental question: why do hours-earnings "packages" vary across jobs? While differences across workers in the demand for leisure and other nonwork uses of time likely contributes to the observed variation, Barzel (1973) noted that work schedules can also vary between jobs because idiosyncratic production setup costs or other workplace-specific circumstances of technology generate heterogeneity across jobs

[7] See Table 1 in Trejo (2003; p. 538)

in the productivity of employment of otherwise identical job skills. In particular, the value of overtime hours to the firm could vary across establishments, depending on the production technology, the distribution of market demand, and the costs of coordination of firm work force efforts due to worker leave policies and absenteeism.

Kinoshita (1987) develops a model of the determination of hours worked that can be viewed as an explicit Fixed-Job Model. Kinoshita's model is an application of the Rosen (1974) hedonic market model in which hours worked is the primary job characteristic of interest to both firms (because it can influence workplace productivity) and workers (because it influences the worker's allocation of time). In a given occupational labor market (i.e., jobs requiring similar sets of skills) firms and workers sort themselves out between high total earnings/high hours worked employment bargains and low total earnings/hours worked employment bargains. This variation in earnings-hours packages generates what Kinoshita terms the "Hedonic Wage Curve"— the market equilibrium locus of total compensation and hours worked bargains across jobs. Holding other job characteristics constant, the slope of the Hedonic Wage Curve is the gain (loss) in total compensation that would result from making an alternative employment bargain in the job market that has one more (less) hour of work.

Consider the overtime hour dimension of the employment bargain and denote the slope of the Hedonic Wage Curve in the overtime hour region as the Job Market Overtime Premium. Figure 1 illustrates how the Job Market Overtime Premium relates to coverage of the FLSA legal overtime premium for a job with given productive characteristics. Assuming that total job compensation is solely hours-related earnings, the Hedonic Wage Curve is depicted by the thick line labeled $\Phi(H)$.[9] At point A, with a 40 hour work schedule and no overtime, firms offering this employment bargain have valuations of work schedules represented by the curve $F_A(H)$ while workers choosing this employment bargain have preferences represented by the curve $U_A(H)$; both curves are tangent to $\Phi(H)$ at A. The straight-time wage rate associated with this employment bargain, W_A , is indicated by the angle of a ray from the origin through A. Note that at point A (as well as at point B) there is no necessarily relationship between the straight-time wage, (or the overtime wage rate at B), with worker's rates of substitution between income and

[8] In his analysis, Trejo also views the Fixed-Job Model as interpreting cross section hours-earnings data as an hedonic wage locus, but since he compared jobs with the same hours of work, issues of functional form of the hedonic wage locus did not have to be considered.

[9] $\Phi(H)$ is constructed as a straight line for simplicity of exposition.

leisure or (implicitly) the firm's rate of substitution between hours and workers[10]. As in the logic of Trejo's use of the Fixed-Job Model, employment bargains with overtime such as illustrated point B on Φ(H) may require some downward adjustment in the straight-time wage rate <u>even if all jobs offering overtime also required payment of an overtime premium</u>.

If overtime pay regulation does change the structure, but not the level, of job compensation when the Hedonic Wage Curve defines the job market equilibrium, then the Hedonic Wage Curve also defines how the structure of compensation is influenced by differences in overtime hours between jobs. This point can be illustrated by the following example of the structure of job compensation somewhat more general than depicted in Figure 1. Suppose that all compensation is cash earnings, and cash earnings for all jobs has the following structure: (1) "straight-time earnings" for standard hours, S, at the straight time wage rate w; (2) "overtime pay" for overtime hours, O, regulated to be 1.5 times w; (3) an annual per-worker payment (a "bonus"), B, which is independent of hours worked. If the Hedonic Wage Curve does define the job market equilibrium, then the relationship between total cash earnings, straight-time wages, the annual per-worker payment, and the ratio of overtime hours to the standard work week, (O/S), across jobs is given by:

$$(1) \qquad \Phi(H; H > S) = w \cdot S\left[1 + 1.5\left(\frac{O}{S}\right)\right]\left[1 + \beta\left(\frac{O}{S}\right)\right]$$

where the β parameter reflects the ratio of hours-related earnings (straight-time and overtime pay) to annual per-worker payments in the bonus B.

Equation (1) determines the combinations of w and B that are consistent with overtime pay regulation and the cross section earnings-hours worked locus being located on the overtime region of the Hedonic Wage Curve. If (1) holds, it also constrains what adjustments in w and B can occur with variation in overtime hours. Taking logs of both sides and using approximations appropriate for when the ratio (O/S) is small, the elasticity of the compensation with hours worked across jobs in the overtime hour region has the following decomposition:

$$(2) \qquad \frac{d\ln\Phi}{d\ln H} = \frac{d\ln\Phi}{d(O/S)} \approx \frac{d\ln w}{d(O/S)} + \frac{d\beta}{d(O/S)} + 1.5\,.$$

[10] Cutler and Madrian (1998) analyze firm decision-making on the mix of hours worked and employment levels, using the Hedonic Wage Curve as the relevant job market constraint on firm choices.

Thus, if the elasticity of total earnings with respect to overtime hours, the first term in (2), is less than 1.5 then job market equilibrium can be maintained by either reduction in the straight-time wage w and/or the relative size of a bonus supplement β.

IV. Establishment Data on Job Compensation Costs and Overtime Hours

The research in this paper uses data from a March 2004 cross section of the BLS National Compensation Survey (NCS). The NCS provides a representative sample of U.S. private industry jobs that allows quarterly estimation of the BLS Employment Cost Index (ECI) and the Employer Costs for Employee Compensation (ECEC) series. The NCS sample is selected using a three stage stratified design with selection probabilities proportional to employment at each stage; the first stage samples areas, the second stage samples establishments, and the third stage samples jobs (rather than individual workers in jobs—the data I use are job averages). At the initiation of data collection a BLS field agent visits the sampled establishment to draw a sample of jobs within the establishment, and collects information on a number of characteristics of the sampled establishment (e.g., industry, establishment employment size) and sampled jobs (e.g., part time/full time status, whether covered by a union contract).

I used an extract of job level micro data from the NCS that was used to estimate the ECEC for March 2004.[11] The objective of the ECEC statistical program is to estimate the level of total employer costs for employee compensation per hour worked for various job market aggregates by both occupation and industry (such as “managerial occupations”, or “transportation industries”). Thus, a great deal of effort is directed at initiation of NCS data collection to obtain the usual annual work schedule as well as usual annual overtime and annual leave hours (e.g., holidays, vacations, sick leave) that are offered in the sampled job. Detailed information on the various components of total employer cost is also obtained for sampled jobs. Data collection on the components of annual employer costs include: straight time wage rates, supplemental cash pay (overtime earnings, shift differentials, bonuses), employer contributions to worker retirement and health insurance plans, and payroll taxes such as employer Social Security taxes.

I restricted the analysis to my estimate of those jobs paid by the hour (an “hourly job”), jobs that have the potential of being paid for overtime work. NCS data collection includes an

[11] To see the latest ECEC statistics, go to http://www.bls.gov/news.release/pdf/ecec.pdf . The micro data are collected under a pledge of confidentiality and hence have very restricted access. Researchers can submit a research proposal for obtaining access to the data at the BLS office in Washington, D.C.; see

indicator of whether there the firm has an explicit provision for compensating overtime work, whether or not there are overtime hours actually worked; this provision is my indicator for an "hourly job". Table 1 shows the estimated incidence of such "hourly jobs" by major occupation group in March 2004. While covering about 80 percent of U.S. private industry jobs and almost all jobs in the machine operator, assemblers, and inspector occupations, Table 1 also shows relatively few jobs are covered in the executive, administration, and managerial occupations, and that coverage is also thin in other occupational groups where salaried compensation is the rule. However, in salaried jobs employer measures of hours worked may underestimate hours worked, as employers may have little incentive to directly measure hours worked beyond the usual work schedule.[12]

To separate out job costs that could be directly affected by overtime hours from other job costs that would be largely independent of overtime hours worked, I followed a taxonomy suggested by Ehrenberg and Smith (2000) to construct measures of "hour-related labor costs for job compensation" and "worker-related labor costs for job compensation". Exhibit I shows the ECEC compensation elements I have categorized in each aggregate cost measure. Since the data used are averages over worker values in the job, this classification is not correct in all cases. For example, Federal and State Unemployment Insurance payroll taxes are classified as worker-related labor costs because these taxes are levied upon only the first $7,000 of annual earnings in most states, below the annual earnings of most workers. However, for workers with very low earnings, these costs would be better considered a component of hours-related labor costs. To mitigate problems of misclassification due to low annual earnings, the analysis was restricted to jobs having year-round work schedules, thus eliminating seasonal jobs and jobs on academic year work cycles from the analysis.

Since the Fixed-Job Model predicts that the incidence of overtime work can be lower in jobs that pay at or "close to" the minimum wage if subject to the overtime pay requirements, I used the straight-time wage rate information in the sample to code jobs as "low wage' jobs if the average straight-time wage rate was less than $6 per hour. In many low wage retail and service jobs, workers who start at the minimum wage do get an increase if they stay on the job for some specified length of time. Thus, a job with an average wage rate above $5.15 per hour can

information at http://www.bls.gov/bls/blsresda.htm . If a researcher does gain access to replicate this research, I will be happy to provide my data extracts, codebooks, and logs.

[12] Allegretto, Corcoran, and Mishel (2004) show that the weekly work schedule hours for school teachers in the NCS data are significantly lower than usual weekly hours of work of teachers as measured in the Current Population Survey (CPS).

nevertheless include many workers who earn at the minimum and thus subject to the constraint on the offering of overtime work emphasized in the Fixed-Job Model.

I further restricted the sample to compare a set of jobs assumed to subject to the FLSA overtime pay regulations (a "treatment" group) with a set of jobs assumed to be not subject to the FLSA overtime pay regulations but that could nevertheless require overtime work (a "control" group). The NCS does not ask employers whether sampled jobs are subject or exempt from FLSA overtime pay regulations, so the assignment of jobs to a treatment or control group was based on the weekly work schedule information provided for the job in data collection. Any hourly job with a work schedule of exactly 40 hours a week was assumed to be subject to the overtime pay regulations. The NCS data indicate that relatively few full-time hourly jobs (those that compensate overtime work) have weekly work schedules over 40 hours a week—such jobs comprise only 0.57 percent of all employment in hourly jobs—and many of those jobs that do have worker weekly work schedules over 40 hours a week are in transportation occupations that can be exempt from the FLSA overtime pay regulations.[13]

The set of hourly jobs for the "control group" were those year round part time jobs with work schedules of 32 hours a week or less. Of course, sufficiently high overtime hours worked in these jobs could push total hours worked over the 40 hour a week threshold and thus trigger required time and a half pay.[14] However, the distribution of annual overtime hours observed in the data for part time jobs indicate that such potential impacts would be minimal. For example, the 95th percentile for annual overtime hours in the set of jobs with reduced work schedules is about 166 hours. Suppose that this overtime work was concentrated in 20 weeks a year, requiring 8.3 hours of overtime per week.[15] In this case, a job having a 32 hour week regular schedule would require time and a half pay for a total of only 6 of the 166 overtime hours per year.

Table 2 provides some summary characteristics on compensation and overtime hours for the two groups of jobs. As expected, the data indicate that, on average, part time jobs have lower wages, have less worker-related costs (i.e., provide less employee benefits), and are less likely to require overtime. (That part-time job status appears to be a compensation-determining

[13] In addition to the case of Captains, Mates and Pilots of Water Vessels mentioned above, about 23 percent of those employment in the occupation Truck Drivers—Heavy and Tractor Trailer (long haul trucking) and 39 percent of employment in the occupation Sailors and Marine Oilers have work schedules over 40 hours. These cases are excluded from the analysis.

[14] Of course, employers may negotiate voluntary overtime premiums with their part-time workers, but information on such overtime pay is voluntary or mandatory is not collected in the NCS.

[15] Unfortunately, the NCS does not collect data on the distribution of overtime hours worked over the year.

characteristic in of itself will be considered in the design of the statistical analysis.) Among jobs with usual overtime hours, the 40 hour a week group of jobs does have a substantially higher mean number of annual overtime hours (about 126 hours) than in the reduced hour job group (about 46 hours). However, the analysis will focus on comparing variation with overtime hours within each group, so it is important to note that the variances in the ratio of annual overtime hours to annual work schedule hours in each group of jobs are similar, and we conduct analyses using this ratio variable.

V. Estimation Methodology and Statistical Results—Effects on the Incidence of Overtime Work

To analyze the determinants of the incidence of overtime work, I assume that there is a cross section function relating expected profits of using overtime to its various determinants, such as firm technology, market demand, and the cost of coordinating employment within the firm. Thus, given that profits of overtime use have a stochastic component, the firm and job characteristics that are expected to influence the profitability of overtime use are also assumed to influence the probability of overtime use.

Given this framework, two propositions follow. First, in the Fixed-Wage Model overtime pay regulation introduces a kink in the labor cost curve that is not present in other jobs; for the same straight-time wage rate, marginal labor costs are higher and profits are lower with overtime use. Thus, holding other job characteristics the same, a given wage rate should be associated with a lower probability of overtime in a job with overtime pay regulation than in a job not subject to overtime pay regulation. Second, in the Fixed-Job Model jobs paying "close to" the minimum wage will have lower profits with overtime use than other jobs, because the minimum wage prevents downward adjustment of the wage rate to facilitate the optimal employment bargain. Hence, the probability of overtime use in a job should be lower in low wage jobs (all other things being equal) when subject to overtime pay regulation.

To test these propositions, I estimate two variants of a cross section probability of overtime function, allowing the effects of the straight-time wage rate and being a low wage job to vary whether a job has a 40 hour a week work schedule (presumed covered by overtime pay regulation) or a work schedule of 32 hours or less a week (presumed not to be impacted by overtime pay regulation). Among the variables obtained in NCS data collection that are used to control for the effects of other factors on overtime use in these probability functions are the industry of the establishment, firm establishment employment, whether leave is provided workers on the job, whether the job is a union job, and the level of worker-related labor costs. Providing leave to workers could increase the costs of coordination of the labor force due to absenteeism and thus increase the probability of overtime use. Higher levels of worker-related labor costs could induce firms to use the existing labor force more intensively, increasing the probability of overtime use.

The two variants used for estimating overtime use incidence equations were a linear probability function, estimated by OLS, and the odds ratio formulation of the logit function. The odds ratio formulation of the logit was used to facilitate comparisons to the results for linear probability function, exploiting the property of the logit functional form that the marginal impact of a variable on the odds of overtime use does not depend on the level of that variable. Thus, testing the null hypothesis for a zero coefficient on a variable in a linear probability model is similar in intent to testing the null hypothesis for a coefficient of one on that variable in the odds ratio formulation of the logit function. Looking at the broad pattern of results in this way, the results of the two estimations are quite consistent; that is, variables having a negative coefficient in the estimated linear probability function also had a coefficient of less than one in the odds ratio formulation of the logit function. The same set of statistical controls were used in both estimations, except that the linear probability function included very detailed industry coding of jobs (equivalent to 777 fixed effects) while the logit function used more aggregated industry coding. The sample size for both estimates was 20,835 jobs.

The results of the analysis of incidence are given in Table 3. The estimated impact of wages rates in both probability functions is consistent with the Fixed-Wage Model predictions. The Fixed-Wage Model predicts the impact of a higher wage rate should be greater in jobs subject to overtime pay regulation. Among jobs with 40 hour work week schedules, both estimates indicate a statistically significant reduction in the probability of overtime with an increase in the straight-time wage. (In the estimated logit function the coefficient on the straight-time wage rate, 0.3998, indicates that the odds fall with an increase in the wage.) In contrast, the estimated impacts of a higher wage rate, while also negative, are smaller in magnitude among jobs with work schedules of 32 hours or less, and are not statistically significant. The evidence for the effects predicted by the Fixed-Job Model from a job having a wage close to the minimum wage is not as strong. Being a low wage job does reduce the probability of overtime use among jobs with 40 hour work schedules in both of the estimated probability functions, but neither is statistically significant.

Table 3 also reports the estimated effects of other selected job and establishment characteristics in the probability functions. As indicated by the summary comparisons in Table 2, part-time jobs have a much lower probability of overtime use, holding other job and establishment characteristics constant. Higher worker-related labor costs raise the probability of overtime use, in line with the expectation that labor would be used more intensively given greater worker-related costs. The probability of overtime use rises with establishment size and whether work leave is provided on the job. Also, the results indicate a small but statistically significant lower probability of use of overtime among union jobs.

VI. Estimation Methodology and Statistical Results—Effects on the Level and Structure of Compensation

In this section we examine data that pertain to the effects of overtime pay regulation on job compensation among the subset of jobs that do require overtime. The general strategy is to assess whether the predictions from the Fixed-Job Model or the Fixed-Wage Model are more consistent with cross section equations estimated by Ordinary Least Squares (OLS) that relate the level and structure of compensation to overtime hours worked, comparing jobs with 40 hour work schedules with jobs with reduced weekly work schedules.

Two alternative specifications of the compensation equations are estimated. First, the log compensation measures—total hours-related labor costs, straight-time wage rates, and total worker-related labor costs--are each specified to be a linear function of the ratio of annual overtime hours to the annual work schedule, allowing the coefficients on these variables to differ between part time jobs and forty hour a week jobs. The estimations using this specification provide a first approximation to whether higher overtime hours induce changes in the structure of job compensation that are suggested by the Fixed-Job Model and shown in equation (2) above. The second specification is more general, allowing the log compensation measures to be a quadratic function of overtime hours (again, allowing the coefficients on these variables to differ between part time jobs and forty hour a week jobs). Using the quadratic specification, levels of hour-related labor costs expected under the Fixed-Wage Model are compared to the levels of hour-related costs predicted by the cross section relationships, holding job characteristics constant.

The use of a ratio of overtime to scheduled work hours in the first specification is motivated from a log decomposition of the effect of the various components of hours worked on a log compensation measure. Defining net hours worked as H = S + O – L (H—net hours worked; S—usual work schedule hours; O—overtime hours; L—leave hours), then when O/S and L/S are small, ln (1 + O/S) ~ O/S, ln (1 – L/S) ~ -L/S, and ln H ~ ln S + O/S – L/S. Assuming that these different margins for hours worked can have different effects on compensation I estimated the following relationship:

$$\text{(3)} \qquad \ln C_i = \alpha + \sum_{1}^{M} \beta X_{ij} + \delta \ln S_i + \Phi_F \left(O_i / S_i \right) + \Phi_P \left(O_i / S_i \right) + \kappa \left(L_i / S_i \right) + \varepsilon_i \,.$$

In (3), C_i represents one of the three compensation measures and ε_i is an error term. The X_{ij}s in the equation include those wage-determining job and establishment characteristics obtained in NCS data collection I assume are exogenous variables. Even though the specific hours worked package is subject to bargaining with workers and thus endogenous, I assume that the firm unilaterally decides whether to create a part-time job or a full-time job on the basis of skill set/productivity decisions about job use in the firm's production technology.[16] (For example, because of the time limitations, part time workers in a given occupation may have fewer job responsibilities.) Thus, the Xs include a set of detailed (6-digit Standard Occupational Classification) occupation / full time / part time combinations as dummy variables, representing a total of 769 fixed effects, so that the specification in (3) allows for a separate part time / full time compensation differential in each detailed occupation. Other job characteristics included in the Xs include whether the job is a union job or whether incentive pay is used. The Xs also include several establishment characteristics: dummy variables for major industry classification of the establishment, the Census region location of the establishment, and whether the establishment is located outside a metropolitan area, and the log of establishment employment as an indicator of establishment size.

The remaining terms in equation (3) represent the various effects on the compensation measures with determination of the hours worked package for the job. These variables are endogenous and must be uncorrelated with the error term for OLS estimation to obtain unbiased estimates of the hours worked parameters. (We discuss this assumption in more detail below.) The coefficient on the log of annual work schedule hours, δ, reflects the effect of variation in weekly work schedule hours only among part time jobs, since annual work hours is the same among all the jobs with 40 hour work schedules. The coefficient Φ_F measures the impact of variation in a compensation measure from the overtime ratio among forty hour work

[16] Using NCS data, Lettau (1997) shows that there is a full time/part time compensation differential among identical occupations within the same establishment.

schedule jobs and the coefficient Φ_P measures the impact among reduced work hour schedule (32 hours or less per week) jobs; I assume the effects of overtime pay regulation are minimal in the latter group. Finally, the coefficient on the leave ratio, κ, should be negative (more leave implies fewer hours worked) if representing tradeoffs on the leave dimension of the hours package along the Hedonic Wage Curve.

Both the Fixed-Wage Model and the Fixed-Job Model suggest systematic differences between Φ_F and Φ_P. In the equation for log total hours-related compensation, Φ_F and Φ_P provide estimates of the elasticity of compensation with respect to overtime hours. In the Fixed-Wage Model Φ_F would be determined by the statutory overtime premium and thus should be close to (but below) 1.5 with positive overtime hours.[17] In contrast, in the Fixed-Job Model, the elasticity is determined by the Job Market Overtime Premium, which would depend on the curvature of the Hedonic Wage Curve in the relevant overtime region. In the equation for log straight-time wage, Φ_F and Φ_P provide estimates of the adjustments to straight-time wage with varying overtime use. As indicated by equation (2) above, the Fixed-Job Model suggests that if the Job Market Overtime Premium is less than 1.5, then in full-time jobs, the straight-time wage could fall with increased overtime use so that Φ_F is expected to be negative in the straight-time wage equation. Also, in the Fixed-Job Model Equation, equation (2) above also suggests that among forty hour a week jobs an alternative or additional way for the structure of compensation jobs to adjust to the constraint of payment of the FLSA overtime pay requirement would be for total worker-related costs for compensation to fall with higher overtime; in the Fixed-Job Model Φ_F could be negative in the equation for worker-related costs for compensation as well.

I obtain OLS estimates of the equations, accounting for correlation of errors across jobs in the same establishment. To be able to use these results to evaluate the predictions of the Fixed-Job Model I have to assume that the relationships estimated allow some inferences about the Job Market Overtime Premium—the implicit price of an hour of overtime along the relevant region of the Hedonic Wage Curve. However, Hwang, Reed, and Hubbard (1992) show that OLS estimation of a hedonic wage locus from cross section data can produce biased estimates of the implicit price of a job characteristic when there is a strong correlation between an unmeasured component of job productivity and worker demand for that job characteristic. When hours worked is the relevant job characteristic, workers with more valuable labor market skills may choose to increase their leisure through taking jobs with fewer scheduled hours, more leave hours, or requiring less overtime hours, assuming the demand for leisure is a normal good among workers generally. When overtime hours is a channel for worker demand for leisure and that the statistical design does leave unmeasured many determinants of worker skills, OLS estimation could generate downward-biased estimates of the effect of overtime hours on the compensation measures. Also, the lack of data collection on worker characteristics in the NCS prevents the use of instrumental variable estimation (that is, using instrumental variables for the hours worked measures that are correlated with worker preferences for leisure but uncorrelated with the value of worker market skills, such as whether the worker is a multiple job holder).

However, there are several characteristics of the data I use that can limit the degree of OLS bias in estimating the relationship between overtime hours and job compensation. First, the set of exogenous variables account for a high proportion of the variance in the measures of job compensation; adjusted R-squares are about 0.80 in the equations for total hour-related and worker related job compensation and about 0.73 in the equation for the straight-time wage rate. Hwang, Reed, and Hubbard (1992) show that as the R-square of an OLS estimated regression approaches 1, then OLS bias approaches zero. Secondly, a data analysis I completed for an earlier paper (Barkume (2006)) suggests that OLS bias is likely to be a problem for leave hours, but not for overtime hours or usual work schedule hours.[18]

Table 4 shows the results of estimating the parameters for the three compensation measures using the specification shown in (3) above. The first two rows report the coefficients for Φ_F and Φ_P in the three compensation equations. These results suggest some support for the Fixed-Job Model: (1) the estimated elasticity of hours-related labor costs for compensation, while greater than 1.0, is substantially below 1.5 in jobs with forty hour work schedules and not statistically different from the corresponding elasticity in the reduced-hour jobs; (2) In the straight-time wage equation Φ_F is negative and statistically significant while the Φ_P coefficient is not statistically significant. But note that in the worker-related costs equation, the effects of overtime hours are not statistically significant in forty hour jobs, which is inconsistent with the proposition that worker-related costs are a channel for adjusting total labor costs under an overtime pay constraint.

[17] In the Fixed-Wage Model, the average wage rises with more overtime, while the marginal overtime wage remains constant at 1.5 times the straight-time wage.

[18] In the earlier paper, I estimated residuals from a regression of log per-hour compensation measures on the exogenous variables but excluding the hours worked measures. I then regressed these residuals on the measures of the three dimensions of hours worked. I did find a significant negative impact of leave hours on the compensation residuals (see Barkume (2006; Table 4)).

Some of the other results of the estimation shown in Table 4, while not directly bearing on evidence for the Fixed-Job and Fixed-Wage Models, are of interest in themselves: (1) Whether a job is in the comparison group (32 hour or less work schedule) does not have statistically significant effects on any of the compensation variables, reflecting that the effect of part-time job status has been captured with the occupational-specific part-time/full time differentials in the equation specification; (2) The coefficients on the leave ratio in all three equations are consistent with the findings of Altonji and Usui (2005), who found that more leave is associated with higher compensation, but also inconsistent with the estimates reflecting a leave hour segment of the Hedonic Wage Curve; (3) Because the coefficients for the employment size, union job, incentive pay, and non-metropolitan job location variables are almost identical in the hours-related total compensation and straight-time wage rate equations these job characteristics affect hours-related labor compensation only through determination of wage rates, not through determination of hours of work.

To compare predicted labor cost differentials between jobs with different amounts of overtime hours to those expected under the Fixed-Wage Model, the labor cost equations were re-estimated using a more flexible functional form. Specifically, in the regression equations for the log compensation measures specified in equation (3) above, the terms $\Phi_F(O_i/S_i) + \Phi_P(O_i/S_i)$ were replaced with a quadratic set of terms having the form: $\eta_F O_i + \eta_P O_i + \lambda_F (O_i)^2 + \lambda_F (O_i)^2$, again allowing the coefficients to vary between the 40 hour full time jobs and the reduced hour jobs.[19] Using estimates of the η_F and λ_F coefficients, predicted log differentials for total hours-related labor costs and the straight time wage rate were generated for selected points in the distribution of annual overtime hours among the 40-hour jobs, relative to jobs without overtime with the same job characteristics. As was the case for the results using the overtime ratio specification, shown in Table 4, overtime hours had no statistically significant impacts on the log of worker-related labor costs in the quadratic specification.

Table 5 summarizes the results of this exercise. In the first column are the points of the distribution of overtime hours among 40 hour jobs to be compared: 25th percentile (29.7 hours), median (82.8 hours), 75th percentile (175.3 hours), and the 90th percentile (281.6 hours). In the second column is the frame of reference for the predictions from the estimates, the expected log hours-related labor cost differential using the simplest Fixed-Wage Model (straight-time wage rate does not vary with overtime hours)--ln [(1.5 overtime hours)/annual work schedule hours]. In

[19] It turns out that the differences between the quadratic coefficients for the part time jobs and those for the full time jobs were not statistically significant.

the third column is the predicted log hours-related labor cost differential, holding other job characteristics constant. Comparing the second and third columns, the predicted log differential in hours-related labor costs is about 85 % of the log differential expected with the simplest Fixed-Wage Model. The third column gives the predicted adjustment in the straight-time wage with increased overtime. (Because the straight-time wage rate equation is independently estimated, the log differentials in the second and third column columns do not exactly sum to the log differential expected with the Fixed-Wage Model.) Increased overtime levels are associated with downward adjustments in the straight-time wage rate but these predicted adjustments are modest.[20] Given the range of observed overtime hour use, only small reductions in the straight-time wage rate are consistent with the labor cost differentials falling significantly short of those predicted by the Fixed-Wage Model. For example, the data in Table 5 show that a job having annual overtime hours at the 90th percentile of the distribution, about 282 hours per year, the log wage differential predicted relative to a job without overtime would be only about -0.03 for the log cost differential to be 85% of that predicted by the Fixed-Wage Model.

VII. Conclusions and Extensions

The Fixed-Job Model implies that U.S. overtime pay regulation should have little effect on the incidence of overtime and the level of job compensation, except for legal barriers to worker-firm transactions such as the minimum wage. I did find that increases in labor costs induced by more overtime work fall substantially short of the increases predicted by the Fixed-Wage Model, and that this mitigation of cost growth is in part due to modest declines in the straight-time wage with more overtime work. However, it is more difficult to establish that these results reflect the importance of the Fixed-Job Model in the operation of the labor market. My estimation of the labor costs – hours worked relationships does not rule out the possibility that workers with more overtime hours are less productive in ways not captured by the statistical controls in the analysis, with those workers commanding higher compensation also avoiding jobs with more overtime. Furthermore, the results of the incidence analysis are consistent with the predictions of the Fixed-Wage Model. Higher wages reduced the probability of offering overtime in full time jobs subject to overtime pay regulation but not in part time jobs not requiring overtime pay premiums, consistent with the kink in the labor cost structure with overtime hours implied by the Fixed-Wage Model. Also, I found that full time jobs subject to overtime pay regulation but paying at or close to the minimum wage did not have a lower probability of overtime work, as would be predicted by the Fixed-Job Model.

[20] In the straight-time wage rate equation, the hours squared term is not statistically significant.

A more clear-cut test of the relevance of the Fixed-Wage and Fixed-Job Models than in analysis of cross section data may be found in examining the effects of a recent change in the U.S. overtime pay regulation known as the "Fair Pay Initiative"[21]. The Fair Pay Initiative regulations, introduced in August 2004, revised somewhat the rules for exemption of the "white collar" (executive, administrative, and professional) jobs. Any white collar job paying a salary of less than $455 per week is now covered by the overtime pay requirement without exception. Any white collar job previously determined to require overtime by virtue of job duties is nonetheless now exempt from the overtime requirement if worker earnings in the job exceed $100,000 per year. For white collar workers within those earnings bounds, there are revisions in the job tests for exemptions to overtime requirements affecting certain occupations, such as low-level salaried supervisors. The Fixed-Wage Model should predict earnings increases in lowly paid salary jobs requiring overtime and earnings decreases in salaried jobs having overtime pay protection but earnings over $100,000 per year; in contrast, the Fixed-Job Model predicts no systematic earnings differences should occur with these regulatory changes.

The Fixed Job Model does place considerable emphasis on the ability of workers and firms to contract the optimal employment bargain. But it may provide a useful supplement to studying other labor market issues, instead of just assuming that firms and workers always act as price-takers in the job market. For example, Barzel (1973; pp. 230-233) suggested that a possibly viable response of workers and firms to a minimum wage increase would be an increase in hours per worker in the employment bargain (lowering average hourly earnings); if so, the impact of a minimum wage would be reduced employment <u>and</u> increased hours per worker. An overtime pay requirement would reduce the potential for revising the employment bargain in this way, so that this potential effect of minimum wage increases on hours worked suggested by the Fixed-Job Model would be expected to be concentrated in part time jobs.

[21] For background information, see the relevant Department of Labor website page http://www.dol.gov/esa/regs/compliance/whd/fairpay/main.htm . For an early analysis of the consequences of this regulatory initiative (using the Fixed-Wage Model!) see Eisenbrey (2004).

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Table 1. Estimated employment incidence by occupation of jobs with provisions for paying overtime (proxy for "hourly jobs" in the analysis), U.S. private industry, March 2004

Major Occupational Group	Employment in jobs with overtime provisions (millions)	Share of total occupational employment
Professional and technical	8.994	0.58
Executive, administrative and managerial	1.705	0.19
Sales	9.453	0.76
Administrative support, including clerical	17.300	0.91
Precision production, craft and repair	9.959	0.93
Machine operators, assemblers, and inspectors	7.220	0.99
Transportation and material moving	5.006	0.90
Handlers, equipment cleaners, helpers and laborers	7.951	0.96
Service workers , except private household	19.300	0.94
All US private industry	86.892	0.80

Source: Job level microdata from BLS National Compensation Survey, March 2004 cross section, using current employment weights.

Exhibit I

ECEC Data Elements Measuring Hour-Related and Worker-Related Labor Costs

Hour-Related Labor Costs for Job Compensation (primarily a function of hours worked)

Straight-time wage payments

Overtime costs

Social Security payroll taxes (employer share)

Medicare payroll taxes (employer share)

Workers compensation insurance

Defined contribution component of employer pension (employer contribution)

Worker-Related Labor Costs for Job Compensation (largely independent of overtime)

Vacation and Holiday Paid Leave

Paid Sick Leave

Other Paid Leave (e.g., for jury duty)

Payments for Shift Differentials

"Nonproduction" Bonuses (unrelated to worker hours or output)

Severance Payments

Supplemental Unemployment Insurance

Health Insurance (employer contribution)

Life Insurance (employer contribution)

Sickness and Accident Insurance (employer contribution)

Long Term Disability

Defined Benefit component of employer pension

Federal and State Unemployment Insurance payroll taxes

Note: Labor cost components are data elements in the estimation of the BLS Employer Costs for Employment Cost (ECEC), as part of the National Compensation Survey. All labor costs are employer contributions. Classification of "earnings-related" and "worker-related" costs follows Ehrenberg and Smith (2000).

Table 2. Summary data on overtime use and job compensation

	Hourly jobs with 40 hour per week work schedules	Hourly jobs with work schedules 32 hours or less
Sample size (no. of jobs)	16,219	4,622
Estimate of employment coverage (millions)	48.36	20.86
Straight-time wage (dollars per hour)	14.95 (7.51)	9.52 (7.04)
Ratio, worker-related costs to hour-related costs	0.249 (0.151)	0.109 (0.154)
Fraction of employment in low wage jobs (wage below $6 per hour)	0.018	0.172
Fraction of employment in jobs using overtime	0.767	0.281
<u>Jobs with overtime hours:</u>		
-Usual annual hours of overtime work	126.2 (148.2)	45.6 (90.87)
-Ratio, annual overtime hours to annual work schedule hours	0.0607 (0.0712)	0.0407 (0.0842)

Source: Job level microdata from BLS National Compensation Survey, March 2004 cross section, using current employment weights. Data in parenthesis are standard deviations.

	Linear Probability Model	Logit specification (Coefficients are odds ratios)
Straight-time wage rate (log):		
—in jobs with 40 hour work schedules	-0.1584* (0.0250)	0.3988# (0.0636)
—in jobs 32 hour or less work schedules	-0.0293 (0.0340)	0.9632 (0.1914)
Reject hypothesis that coefficients are equal?	YES (t = 3.49)	YES (t = 4.14)
Low wage job (straight-time wage less than $6/hr):		
—in jobs with 40 hour work schedules	-0.0969 (0.0629)	0.4795 (0.1811)
—in jobs 32 hour or less work schedules	0.0595 (0.0445)	1.8520# (0.0544)
Reject hypothesis that coefficients are equal?	YES (t = 2.09)	YES (t = 2.88)
Estimated effects of other selected job and establishment characteristics:		
--Whether job has work schedule of 32 hours or less	-0.5791* (0.0913)	0.0366# (0.0197)
--Worker-related labor costs for job compensation (log)	0.0900* (0.0094)	1.6869# (0.1017)
--Whether job provides paid vacation or sick leave	0.1563* (0.0273)	2.6669# (0.4487)
--Establishment size (log)	0.0191* (0.0056)	1.1104# (0.0316)
--Whether union job	-0.0496* (0.0198)	0.8671# (0.1109)
Adjusted R-square (LPM); Pseudo R-square (Logit spec.)	0.4220	0.2602

Table 3. Estimated effects of straight-time wage rates on overtime incidence: Job level microdata from BLS National Compensation Survey, March 2004 cross section; N=20,835. Dependent variable is whether job requires usual overtime work. Linear probability model: least squares estimation, allowing for correlation of errors across jobs within an establishment; fixed effects for 6-digit NAICS code of establishment (777 industries). Logit estimation: # indicates rejection of the null hypothesis of no impact on the odds ratio (95% confidence interval); statistical controls for industry are 2-digit NAICS codes. Both specifications also include controls for region and major occupational group of job, whether job is located outside an SMSA or uses incentive pay, and the length of the annual work schedule in part-time jobs.

Job characteristic:	*Total hour-related labor costs for job compensation (log)*	*Straight-time wage rate per hour (log)*	*Total worker-related labor costs for job compensation (log)*
overtime hours to work schedule ratio:			
—in jobs with 40 hour work schedules	1.0521* (0.0590)	-0.1795* (0.0608)	-0.0456 (0.1557)
—in jobs with 32 hours or less work schedule	0.8185* (0.1900)	-0.0870 (0.2332)	-0.7218 (0.4304)
Other job compensation variables:			
--whether job has 32 hour or less work schedule	-0.0686 (0.0484)	-0.0944 (0.0522)	-0.1313 (0.0941)
--annual work schedule (log)	0.9156* (0.0310)	-0.0715* (0.0324)	0.7812* (0.1118)
--whether job provides any leave hours	0.0339 (0.0292)	0.0375 (0.0301)	0.8371* (0.0965)
--ratio of leave hours to work schedule, in jobs providing leave	0.6411* (0.1442)	1.495* (0.1475)	10.7557* (0.4118)
--establishment size (log)	0.0297* (0.0027)	0.0296* (0.0140)	0.0831* (0.0064)
--union job	0.2217* (0.0140)	0.2302* (0.0140)	0.4660* (0.0284)
--establishment located outside SMSA	-0.0661* (0.0113)	-0.0621* (0.0114)	-0.0073 (0.0319)
--whether job uses incentive pay	0.1136* (0.0277)	0.1181* (0.0271)	0.0232 (0.0435)
Adjusted R-square	0.832	0.734	0.800

Table 4. **Estimated effects of overtime hours on job compensation (cross section)**. Job level microdata from BLS National Compensation Survey, March 2004 cross section; N=15,069. All jobs in the estimation sample require usual overtime work. Least squares estimation, allowing for correlation of errors across jobs within an establishment. Data in parenthesis are standard errors; an asterisk represents rejection of a zero coefficient using a 99% confidence interval. Other regressors were detailed occupation/full time/part time combinations (equivalent to 769 dummy variables) as well as dummy variables for region and industry.

Annual overtime hours (percentile in distribution of annual overtime hours, jobs with 40 hour weekly work schedules):	*Expected log differential in hours-related labor cost to same job without overtime, Fixed-Wage Model*[1]	*Predicted log differential in hours-related labor cost to job without overtime, holding other job characteristics constant*	*Predicted log differential in straight-time wages to job without overtime, holding other job characteristics constant*
29.7 (25th percentile)	0.0211	0.0177 (0.0015)	-0.0034 (0.0015)
82.8 (50th percentile)	0.0579	0.0490 (0.0041)	-0.0094 (0.0040)
175.3 (75th percentile)	0.1190	0.1019 (0.0081)	-0.0193 (0.0079)
281.6 (90th percentile)	0.1848	0.1603 (0.0120)	-0.0300 (0.0111)

Table 5. **Predicted hours-related earnings and straight-time wage rate differentials in full time jobs with annual overtime hours relative to jobs with no overtime--quadratic specification of the effects of overtime hours.** Standard errors of estimates are given in parenthesis. Same data and covariates as results in Table 4, except that the ratio of overtime hours to the usual work schedule is replaced with annual overtime hours and the square of usual overtime hours, and the estimation allows quadratic coefficients to vary if job has a part-time work schedule.

(1) Ln [(1.5 annual overtime hours)/2080]

Figure 1. The Hedonic Wage Curve and Payment of Overtime Premiums